

CLAIMS

1. An angular velocity sensor comprising:

a vibrator for detecting angular velocity,

5 the vibrator comprising:

a drive electrode unit for receiving a driving signal to drive the vibrator;

a monitor electrode unit for detecting a state of driving the vibrator and outputting a detection signal; and

10 a sensing electrode unit for outputting an angular velocity signal generated based on an angular velocity given to the vibrator, wherein

the drive electrode unit, the monitor electrode unit and the sensing electrode unit are each made up of a bottom electrode formed on a substrate, a piezoelectric film made of piezoelectric material and formed on the bottom electrode, and a top electrode formed on the piezoelectric film, and

an end of the top electrode is located inside an end of the piezoelectric film so as to expose the end of the piezoelectric film beyond the end of the top electrode.

2. The angular velocity sensor of claim 1, wherein

when the piezoelectric film has a thickness of "t", the piezoelectric film is made to have an exposed width "L" of not less than 0.3t, the exposed width "L" extending from the end

of the piezoelectric film to the end of the top electrode.

3. The angular velocity sensor of claim 1, wherein

the vibrator has a shaft and a pair of arms so as to take
5 a shape of a tuning fork, and

each of the pair of arms is provided with the drive
electrode unit and the sensing electrode unit, and is further
provided with the monitor electrode unit on a part thereof that
is adjacent to the shaft.

10

4. The angular velocity sensor of claim 1, wherein
the top electrode, the piezoelectric film and the bottom
electrode are formed into prescribed shapes by dry etching.

15 5. The angular velocity sensor of claim 1, wherein

the substrate is mainly made of silicon, and the
piezoelectric material is PZT.

6. A method for manufacturing an angular velocity sensor
20 comprising a vibrator for detecting angular velocity, the
vibrator comprising a drive electrode unit for receiving a
driving signal to drive the vibrator; a monitor electrode unit
for detecting a state of driving the vibrator and outputting
a detection signal; and a sensing electrode unit for outputting
25 an angular velocity signal generated based on an angular

velocity given to the vibrator, the method comprising a process of forming the drive electrode unit, the monitor electrode unit and the sensing electrode unit, the process comprising:

forming a bottom electrode on a substrate;

5 forming a piezoelectric film made of piezoelectric material on the bottom electrode; and

forming a top electrode on the piezoelectric film,
wherein

10 the top electrode, the piezoelectric film and the bottom electrode are formed into prescribed shapes by dry etching in such a manner that an end of the top electrode is located inside an end of the piezoelectric film so as to expose the end of the piezoelectric film beyond the end of the top electrode.